RESEARCH AND WORKING PAPERS □ 24

URBAN-INDUSTRIAL GROWTH PROCESSES IN SOUTHERN ONTARIO, 1870-1930

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PREFACE

The University of Winnipeg was the location of a major national urban studies conference, hosted by the Institute of Urban Studies in August 1985. The "Canadian Urban Studies Conference" addressed the general theme of "The Canadian Urban Experience - Past and Present." More than ninety specialists spoke during forty separate sessions on such topics as housing and the built environment, economic and community development, planning and urban form, women and the urban environment, and urban government and politics.

This publication is a result of the Canadian Studies Conference. The Institute of Urban Studies is publishing many of the papers presented at the conference in the Institute's publication series. Some of the papers will also appear in the scholarly journal, the Urban History Review/ Revue d'histoire urbaine and in book form.

This conference represented a major effort on the part of the Institute of Urban Studies in terms of fulfilling its role as a national centre of excellence in the urban studies and housing fields.

Alan F.J. Artibise
Director.

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1.0 INTRODUCTION

Economically advanced societies in Western Europe and North America underwent an urban-industrial transformation in the nineteenth and early twentieth centuries. The enormous expansion of the manufacturing industry and its progressive concentration in urban areas were noted by contemporary observers as well as later commentators, who characterized industry as the engine of urban growth in this period. Although a little later and on a more modest scale than in Britain or the United States, the urban places of central Canada grew substantially from about 1870, apparently fuelled by the development of secondary industry. Canadian urban historians have generally described the decades from 1870 to about 1930 as the "industrial era" when the main economic stimulus to growth was local and long-distance trade.[1]

Urban-industrial growth processes have usually been considered at an abstract level and in generalized national terms. This paper reports efforts to relate general theories to the experience of particular urban centres in a regional system. The interacting processes of urbanization and industrialization of the "industrial era" were encountered by the author, in the microcosm of a case-study. This research into the growth of Berlin/Kitchener-Waterloo between 1870 and 1930 revealed a remarkable rate of urban-industrial growth, yet without such obvious initial advantages as large size or superior resources or transportation facilities. Members of the entrepreneurial elite, especially in Berlin to 1914, pursued a deliberate "industrial policy" which was based on a set of beliefs about their town, including the fundamental role of manufacturing industry in the urban economy and the need for determined promotion of their community.

These findings prompted several questions about the typicality of Berlin's experience in relation to more general regional and national

trends. How representative was Berlin/Kitchener of other towns and cities in southern Ontario in the "industrial era," in its actual growth experience, and in the perceptions and behaviour of its entrepreneurial elite? How realistic and accurate were the claims made about the town's prospects and performance by the community leaders? Some random comparisons with other places suggested that there was a fairly widespread perception by business elites that new urban economic functions such as manufacturing should be deliberately encouraged. A superficial survey of actual growth performance across southern Ontario also revealed very selective patterns, which were not easily explained in terms of such impersonal factors as relative location and accessibility, initial advantages and transportation costs. While real growth rates may not have matched a community's ambitions and claims, there did seem to be some scope for a determined elite to stimulate its urban economy, at least for a time.[2]

A systematic, comparative approach to the experience of all urban centres in a regional system appeared to offer a useful perspective for understanding processes of change in the "industrial era." On the one hand, it could provide a more precise substantive and methodological framework for case-studies of individual towns and cities, showing in which respects their experience was similar and in what ways they were unique, thus enabling urban historians "to specify the particular in the context of the general."[3] On the other hand, the research should also contribute to the general theories and models of urbanization and industrialization, by addressing key questions about these interacting processes in one regional setting.

This paper raises the large questions which may be asked about the urban-industrial transformation of southern Ontario. It outlines a research project, involving computer methods and four linked databanks: Time-Series Industrial Data, 1870 Industrial Structure, Municipal Milestones and Thresholds and Municipal Bonuses to Manufacturers

(databanks described in Appendix). The extent to which these data and methods may help to answer or at least reformulate the key concepts and questions is then discussed.

2.0 THE REGION

Southern Ontario had various advantages for urban-industrial growth in the last third of the nineteenth century, being a closely-settled and productive farming region, located centrally within Canada and close to the emergent U.S. manufacturing belt. Large numbers of urban municipalities were incorporated here, earlier than in other Canadian provinces, and local councils quickly took advantage of their powers to promote improvements in transportation facilities and generally to stimulate growth. For the past century, southern Ontario has been the most highly urbanized major region in Canada, with a well-developed system of urban centres and distinctive manufacturing functions (Tables 1 and 2). In 1870, Ontario had 51.8 per cent of Canada's total industrial production (1.17 times its share based on population); by 1929, despite the vast expansion of Canada's settled area in the West, manufacturing was even more concentrated in Ontario, which had 53.3 per cent of Canada's total or 1.61 times its share (Table 3). Toronto's dominance in Ontario by 1850 was strengthened by dramatic growth of its industrial and metropolitan functions in the last third of the nineteenth century, though it remained overshadowed by Montreal in some respects. But southern Ontario was remarkable also for the number and persistent growth of its sub-metropolitan towns and cities, many of them specialized industrial centres[4] (Tables 4 and 5).

3.0 QUESTIONS AND CONCEPTS

What were the critical factors and stages in the concentration of industry in urban centres? How, precisely, did industrial growth affect

Table 1

SOUTHERN ONTARIO: URBAN PROPORTION OF TOTAL POPULATION

	Southern Ontario			Canada
	Total Population	Urban Population	Per cent Urban	Per cent Urban
1871	1,610,921	362,689	22.5	18.3
1881	1,886,903	554,409	29.4	23.3
1891	2,038,151	766,112	37.6	29.8
1901	2,058,093	890,916	43.3	34.9
1911	2,282,355	1,219,677	53.4	41.8
1921	2,639,902	1,633,575	61.9	47.4
1931	3,045,675	2,048,912	67.3	52.5

Sources: Figures of total population from census totals for census subdivisions south of Nipissing lowland; urban population from Marshall and Smith (1978): 24; urban percentages of total Canadian population from Stone (1967): 29. Definitions of urban are generally consistent, except that for 1921 and 1931, Stone included also estimates of the population living in the urbanized fringes of larger incorporated urban places.

Table 2

SOUTHERN ONTARIO: NUMBER OF INCORPORATED URBAN PLACES WITH OVER 1000 POPULATION

Population Size	1871	1881	1891	1901	1911	1921	1931
100,000 +	-	-	1	1	1	3	3
30,000 - 99,999	1	2	3	3	3	2	4
10,000 - 29,999	4	3	5	6	13	16	19
5,000 - 9,999	7	14	15	17	17	19	26
2,500 - 4,999	24	34	37	34	34	38	37
1,000 - 2,499	43	76	90	97	82	81	72
Totals	79	129	151	158	150	159	161

Source: Compiled from Census of Canada published statistics.

Note: The increasing numbers of urban places to 1891 reflect the large number of new incorporations; from 1901 some of the small centres declined below 1000 population and some centres were annexed by larger neighbours.

general urban development? Why did some cities and towns achieve rapid and sustained growth while others stagnated and declined? To what extent was selective or differential growth determined by broad situational and economic forces such as relative accessibility, initial advantage, economics of agglomeration? How significant were human agents and institutions - the local entrepreneurs, individually and collectively - in making decisions based on their perception of opportunity? Could such decisions and actions compensate for or overcome disadvantages in a town's location or resource-base? Such questions have challenged economists, geographers, historians and sociologists, and their ideas provide the conceptual and theoretical framework for the research projects reported here.

3.1 Interaction of Urbanization and Industrialization

The positive association between industrialization and urbanization in economically advanced nations, first noted by Adna Weber in the 1890s, has been elaborated at the general national level by such scholars as Lampard, Wrigley, George and, for Canada, Johnson. They have emphasized that the rise in real per capita income, based on major and continuing changes in technology, was the central identifying characteristic of industrialization.

It is probably futile to try to prove (in Constance Green's words) "which came first, the hen of mounting industrial strength or the egg of increasing urban influence."[5] But it is worth attempting to explore the main factors and phases in their association, as these can be identified in the particular urban centres of a major industrial region.

3.2 Theories of Economic Growth

Our understanding of urban-industrial growth processes has been

enhanced by the two general economic growth theories, which have been advanced to explain the mechanism by which some nations, regions and cities grow faster or more slowly than others. The export base theory emphasized externally induced development: growth within a given area occurs as a response to an increase in demand outside the area itself. Exports generate earnings and set off local multiplier effects through backward, forward and final demand linkages. This theory is helpful in explaining growth processes in a previously undeveloped area, as the Callender-Schmidt-North thesis explains antebellum regional development in the United States or the staples thesis explains early Canadian development. In Canada, it has been adopted as a model of the growth of cities serving resource-based regions of the country's hinterland or periphery, such as Vancouver, Halifax or cities generally outside the Central Canada heartland. The staples model has also been applied to Ontario's economic history, though its relevance is being increasingly questioned.[6]

Sector theory emphasizes internally induced development, in a series of growth stages. After the initial stages of a subsistence economy and specialization in primary production, manufacturing industry expands in response to diminishing resources or returns from primary production coupled with the increasing employment demands and potential market of a growing population. There is a shift from resource processing and basic industries such as textiles to a more diversified industrial structure, marked by a greater emphasis on producer goods, more sophisticated technology and business organization, more industrial linkages, increasing capital investment and higher per capita productivity and per capita incomes. This theory seems more promising in explaining the development of southern Ontario than the export base theory, as it also is more appropriate in understanding the neighbouring American manufacturing belt.[7]

Table 3

REGIONAL SHARES OF INDUSTRIAL PRODUCTION
(related to proportion of national population)

	1870	1900	1929
Maritimes	0.64	0.58	0.38
Quebec	1.08	1.07	1.05
Ontario	1.17	1.24	1.61
West	-	0.64	0.47

Notes: 1. Index values are derived by relating a region's share of national industrial output to its share of national population. An index value of 1.00 would mean that a region had exactly the same share of industrial production as of population. A value higher than 1.00 means that a region had more than its share of manufacturing activity, a lower value that a region had less than its share.

2. Industrial production data for 1870 and 1900 are compiled from published Census of Canada; data for 1929 relate to "value added in manufacture" and are compiled from M.C. Urquhart and K.A.H. Buckley, eds. Historical Statistics of Canada (Macmillan, 1965), Series Q1-29.

Table 4

TORONTO AND MONTREAL SHARES OF PROVINCIAL INDUSTRIAL PRODUCTION

	1870	1900	1929
Toronto % Ontario	11.9	25.0	29.7
Montreal % Quebec	46.5	55.2	63.7

Table 5

ONTARIO: NUMBERS AND PROPORTIONAL SHARES OF URBAN CENTRES WITH OVER 5000 POPULATION

	1870	1900	1929
Number *	12	28	60
Index Value*	1.19	1.21	1.34

*Derived by relating Ontario's share of all Canadian urban centres over 5000 population to Ontario share of total Canadian population.

3.3 Multiplier Effects of Industry on Urban Growth

Theories of urban economists, notably Wilbur Thompson, about the ways in which industry stimulates general growth by the multiplier effects of agglomeration economies and linkages between enterprises, have been applied to the past as well. The historical geographer Allan Pred has devised the circular and cumulative causation model of urban-industrial growth to describe the development of the larger U.S. cities between 1860 and 1914. New manufacturing activity introduced into an existing town or city will produce an initial multiplier effect in the local economy. This will cause an expansion in the city's market or threshold and its capacity to support further industry - both directly and indirectly, by the stimulation of other sectors of the urban economy such as trading, services, construction, public utilities and transportation. As these other urban functions are expanded, new demands are created for the establishment of further factories, which will generate their multiplier effects, and so on in a growth spiral. A further circular sequence of multiplier effects is likely, resulting from the interaction among the increasing number of entrepreneurs in the city, leading to innovations in technology and business organization. These circular and cumulative processes boost a city towards successively higher thresholds of industrial activity and urban size.

Pred elaborated his model, at least for the early period before 1840, to show the importance of information flows in urban growth. The significance of connections with other urban places has also been substantiated in Conzen's work on the banking inter-linkages of U.S. cities in the period 1840 - 1910.

3.4 Selective Growth in Regional Systems

As to the question of selective or differential urban growth - why

some cities grow more rapidly than, and apparently at the expense of others - Thompson's notion of an "urban size ratchet," by which larger cities seem to attain a size past which further growth seems self-sustaining, has been influential. Considering mainly the very largest U.S. cities during the period of rapid industrialization, Pred found that the circular and cumulative growth process did not work out in an identical manner for all places. He adduced a number of ambivalent forces which acted as a brake on expansion in some cities while precipitating the growth of others. Transport improvements (especially railways); production innovations resulting from the adoption of new technology and from agglomeration economies; relative accessibility to large-market areas; and combination and competition in business structure, and availability of capital and labour, leading to spatial concentration in fewer larger centres, were found to be the dominant forces. All these tended to reflect and reinforce the initial advantages of the largest and earliest established cities. However Pred did recognize the emergence of sub-metropolitan industrial cities from previously insignificant centres of lesser size and rank; he also allowed for other considerations like entrepreneurial aggressiveness and initiative and factor immobility or geographical inertia which might encourage the growth of sub-metropolitan centres as much as the larger cities.

Several studies of selective growth in the U.S. manufacturing belt promise to provide analogies for southern Ontario: Williamson and Swanson's examination of urban growth in the American Northeast to 1870, Muller's analysis of the Ohio Valley which he developed into a more general model of selective growth, Meyer's interpretation of the emergence of the American manufacturing belt to 1900, and the overview by Perksy and Moses of the growth performance of specialized industrial cities in the U.S. to 1930. For southern Ontario itself, Smith related patterns of urban growth to railway connections between 1851 and 1921 and, with Marshall, summarized the population growth performance of all urban centres to 1971.

3.5 Human Agency

In seeking to understand and interpret urban-industrial growth processes, there is also the important question of human agency. The question has interest in relation to the emphasis in recent concepts of social theory on "the efficacy of human agency within the essential boundedness of practical life," whether the constraints of environment or of social structure. This emphasis, which is influencing other disciplines as well, may be seen as a reaction against the mechanistic and determinist hypotheses of social science in the 1950s and 1960s.[8]

How significant were entrepreneurs, individually and collectively, in influencing the growth of a particular city in competition with others? Could entrepreneurial drive and community solidarity compensate for a less favourable situation or a late start? Conversely, could entrepreneurial mistakes, lack of initiative or cohesion retard a community's growth, or dissipate its initial advantages? Historians of particular cities, and entrepreneurs themselves, may have been inclined to exaggerate the role of businessmen and community leaders. Social scientists may be more sceptical, but often have had to invoke such residual factors as "entrepreneurial aggressiveness" or "ardent promotionalism" to explain variations from patterns predicted on the basis of broad impersonal forces. The Berlin case certainly substantiates the efficacy of human agency, in the shape of local manufacturers, board of trade and municipal council, to achieve lasting growth and higher rank in the urban system for their city. Beeby's study of Toronto between 1880 and 1910 also supports the hypothesis that human agency was efficacious: of the three decades he studied, the 1890s, when Toronto grew fastest in absolute and relative terms, was the only one when the business elite and City Council pursued a deliberate policy of attracting or retaining industry in the city.

At the regional level, Acheson's study of the Canadian business elite between 1880 and 1910 found important differences between Canadian regions, noting for example the persistence of groups of community entrepreneurs and of "local autonomy" in the Lake Peninsula of Ontario. He contrasts this with a postulated "entrepreneurial failure" in other regions such as the Maritimes, though other studies, notably by McCann, have shown that entrepreneurs in certain communities and districts did make substantial efforts in the 1880s and the early twentieth century, but were defeated by the disadvantages of their environment.

4.0 PRIORITIES AND POSSIBILITIES

How can we try to answer these important questions? Ideally we should need more comparable information than we possess on the many facets and factors involved in the complex reality of Ontario's urban-industrial development. Even potentially valuable statistics which were collected have been discarded or destroyed. But the ability of computer methods to handle multivariate data and to test hypotheses to a known degree of reliability offers the opportunity to probe these questions in more depth and to define them more closely.

A wish-list of what we should like in the form of comparable, quantifiable data would include for the pre-industrial origins: full details of agricultural production and agricultural prices and the ratio of exports to local comsumption; trade data, both the structure of wholesaling and retailing and the flows of commodities between regions; the network of commercial intelligence as well as the frequency and quality of transportation; and the status and behaviour of leading merchants and entrepreneurs in stimulating early industrial development.[9] In tracing the association between industrialization and urbanization, we should like complete details of industrial activity, at the level of the individual establishment, at least every ten years, which could be

aggregated by sector and by areal unit. We also need more precise information about the availability of labour, skilled and unskilled; and about the local, regional and external markets for manufactured goods, the availability of capital and financial services; and the quality of railway services. It would also be useful to know far more about entrepreneurs, their perceptions and business behaviour, their success and failure, their patterns of size, longevity and geographical mobility, their community associations and linkages of kinship and marriage, and about such aspects of technology and business organization as patents, incorporation and attractiveness to foreign investment. However, many of these kinds of information are not quantifiable at the local level or were never collected systematically. For many of these topics and factors, we shall have to continue to depend on inferences from the very general analyses at the national level or on extrapolations from case-studies of individual enterprises or communities.

The present project makes use of several kinds of extant data, which are being made machine-readable in four linked databanks to which others may yet be added (see Appendix). It has been based on the following considerations:

(a) The desirability of linking the general surveys at the national level and the particular case-studies.

(b) The need to focus directly on industrial structure at the onset of rapid industrialization, as well as later, to supplement the more common concern with initial advantages, population size and transport improvements.

(c) The value of considering the growth process in several stages, to accommodate the variable significance of forces and factors at different times.

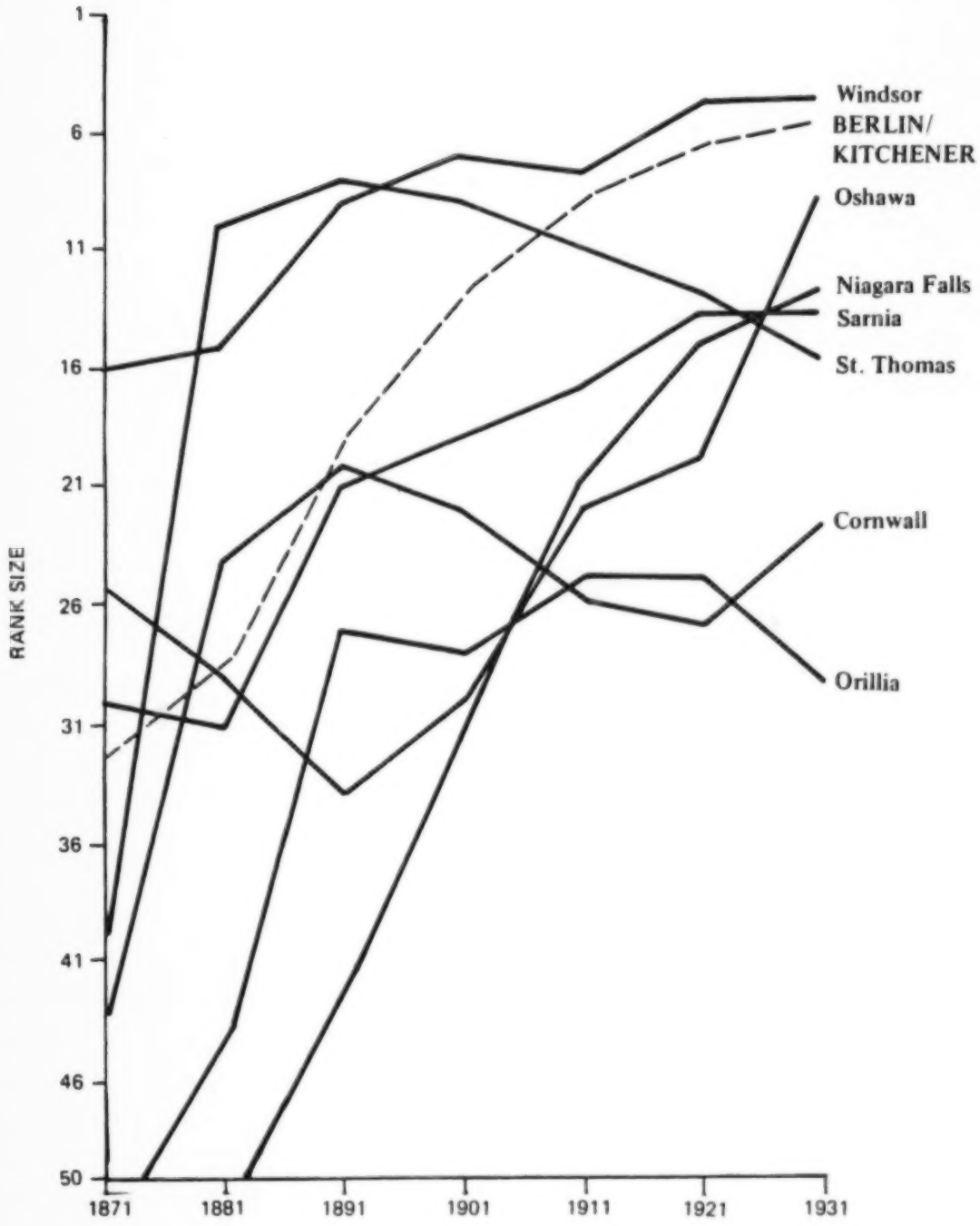
(d) The importance of including all sorts of urban centres, especially the sub-metropolitan--based on their size-class, rate of growth, economic base and location--and including the failures and latecomers.

(e) The dangers of limiting analysis to a single variable, or theory to a single cause or, indeed, of depending too heavily on quantitative analysis which can explain only part of complex, interrelated processes.

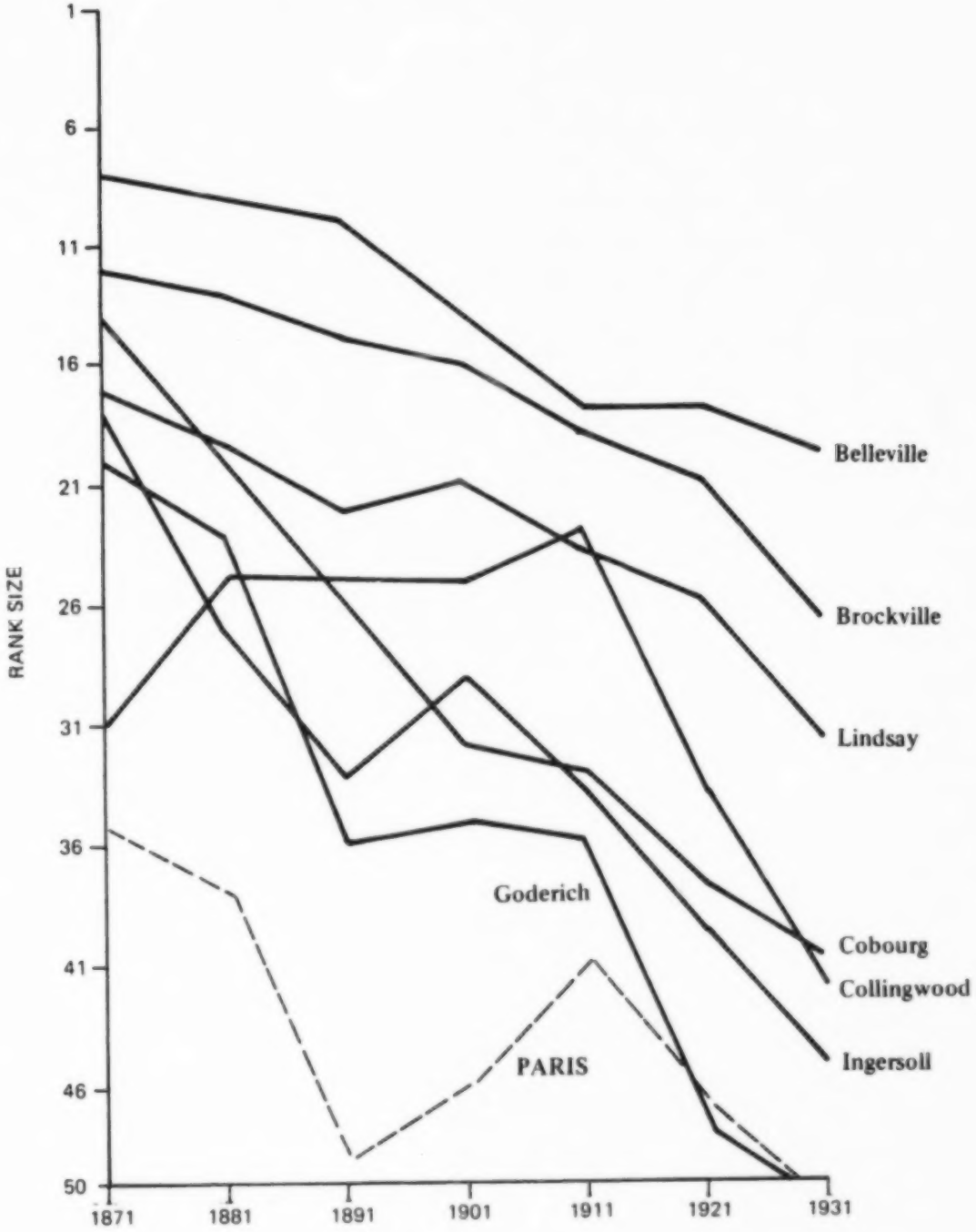
To what extent may analysis of these databanks help in understanding the key questions raised earlier in this paper? The research described here will most directly address the questions of selective growth and the time-space patterns of urban-industrial development. The analysis of certain variables in relation to growth performance will also help to define the other three questions more closely and to provide a more precise substantive and methodological framework for particular studies of individual urban centres or industrial enterprises and for further investigations of critical factors in the development process.

The industrial "time-series" databank for more than a hundred urban places in southern Ontario between 1870 and 1929 allows the analysis of the time-space associations between industrial and urban growth in the region and the selective or differential growth performance of individual urban places. Measurement of growth will be relative to the regional mean for any period of time. It will be possible to achieve typologies based on urban-industrial growth performance over the long term (1870 - 1930) or in shorter periods. Statistical analysis of this sort has already been undertaken for all urban centres in "Central Canada," 1890 - 1929 and 1929 - 1957, as part of research for the Historical Atlas of Canada. This will be further developed for southern Ontario in more detail, to determine links between rates of change in industrial indicators and in urban population, and to identify persistent losers, persistent gainers and latecomers among urban centres. The development of urban centres in various size-ranges may be generalized, illustrating and helping to explain the decline of the smallest towns and villages in the 1890s or the sustained growth of the middle-sized cities in relation to metropolitan Toronto.

SOUTHERN ONTARIO: CHANGES IN RANK SIZE OF SELECTED CENTRES WHICH ROSE MORE THAN TEN PLACES



SOUTHERN ONTARIO: CHANGES IN RANK SIZE OF SELECTED CENTRES WHICH FELL MORE THAN TEN PLACES



A useful measure of industrial efficiency and change, adapted from the work of Laurie and Schmitz on nineteenth-century Philadelphia, provides another means of comparing all the urban centres in southern Ontario. The equation -

$$A = V/(L^{a}K^{b})$$

in which A is factor productivity, V is value added, L is labour and K is capital, and a and b are output elasticities of labour and capital, was applied to data in particular industrial sectors in Philadelphia in 1850 and 1880. But it can also be used on the aggregate values of value added, labour and capital of whole urban centres as these changed over time.

The other databanks will be drawn upon for specific variables, in efforts to explain the selective growth patterns, and to illumine significant factors in the economic growth theories, the mechanism of multiplier effects and the scope for human agency. The "1870" databank promises a great deal of interest in its reconstitution of the industrial structure of the region at the onset of the "industrial era."[10] Having so much detail for individual establishments, which can then be aggregated into industrial sectors and into urban units and grouped in areas and regions, is a unique advantage. Thorough analysis of the details in the manuscript census schedules permits various standardized measures of the industrial structure in 1870--value added per worker (as above), scale of operation, use of inanimate energy and indices of diversification, sectoral specialization and industrial linkage of or dominance by a leading enterprise--to be related to the subsequent growth performance of individual towns or groups of towns. The significance of the producer goods sector can be measured, so contributing to the debate between staples and sector models of economic growth. For the larger urban places (with 15,000 population by 1910), changes in industrial structure between 1870 and 1910 may also be measured and related to overall growth performance.

Patterns of selective growth may also be related to several variables in the "Municipal" databank. The extent to which growth can be explained by initial size at the onset of industrialization may be tested. So may the significance of railway connections and services in facilitating growth: we need to extend the work of Smith by using our data on quality of connectivity, access to competitive services, and frequency of services, in addition to the simple date of first railway connection. At a later date, access to relatively cheap and abundant hydro-electric power could help to explain growth spurts of particular urban centres, and this also may be tested.

By relating such situational factors as early size and railway services to patterns of growth performance, we should also be able to define the scope for human agency more closely. Thus, if we find that two places of the same initial size and railway advantages grew at very different rates thereafter, we should investigate the possibility that entrepreneurship, community initiative and consensus and municipal policies may have been significant. Berlin's remarkable growth during the industrial era may be contrasted with the very different experience of Paris, Ontario, which had been favoured with water-power, deposits of gypsum, an early industrial start and early connections to two railway systems. Yet Paris grew only slowly from the 1860s, dropping in size rank within southern Ontario from 35th in 1871 to 49th in 1901. Local Paris citizens blamed their town's slow growth in the 1880s on "a want of enterprize and push among ourselves" and "sectional jealousies," as well as a contentment with the town as it was.[11] We shall now be able to assess the accuracy of such contemporary judgments, whether self-critical, as in the case of Paris, or more flattering. Although it is difficult to measure the role of subjective, volitional factors against the strength of larger situational forces, there are some variables in the databanks which may be considered as at least partial evidence of local initiative--such as data on the board of trade and the introduction

of various local services, which may be merged into a single indicator. In addition, the "bonus" databank contains direct evidence of municipal policies of encouraging local industry. These must be sensitively analyzed in their time-space patterns in relation to the time-series industrial data.

In summary, in this project we are attempting to link the somewhat static ideas of urban systems with dynamic growth processes, notably industrialization, in order to develop a context in which to understand the urban development of the southern Ontario region and the experience of particular urban centres. We believe that the formulation of general concepts and the creation and analysis of databanks are both essential and complementary in the pursuit of urban history. We expect to be able to measure the urban-industrial growth of all urban centres and to establish the timing and stages of industrialization in the region. We could then provide a clearer comparative framework for individual case-studies of the operation of multiplier effects and of the significance of human agents and institutions, which will also help to refine economic growth theories. If it can succeed in these goals, the project will demonstrate the value of an interdisciplinary perspective, reliable databanks combining many variables, and computer methods. The comparative and quantitative approach of the project is, however, only complementary to the more traditional historical methods which are also needed to study the subtlety, multiple causation and complex interlinkages involved in the processes of urbanization and industrialization.

NOTES

1. For a statement on eras of Canadian urban development, see Stelter (1982); Stelter's 1985 essay is also interesting for its discussion of the regional framework of urbanization.

2. For a discussion of these ideas and findings, see my articles listed in the References.

3. Waller (1983): 11.

4. Sources for the general development of southern Ontario in this period include Gilmour (1972), Kerr (1982), Spelt (1972), Marshall and Smith (1979) McCallum (1980) and Bloomfield, Bloomfield and McCaskell (1983).

5. Green (1966): 82.

6. For the application of the export base theory to the antebellum U.S. see North (1955) and for the staples thesis in Canada see Watkins (1963). The usefulness of the staples thesis to explain Ontario's development, as used by Gilmour, McCallum and others, has recently been questioned by McCalla.

7. Meyer (1983).

8. See Giddens (1979); and also Gregory (1981) who relates the ideas of the social theorists to the concern of Marxian humanism with the relations between structure and agency.

9. I am indebted for some of these items to Douglas McCalla's (1984) agenda for research into the economic history of Ontario.

10. The manuscript schedules of the 1871 census have so far been used for study of particular cities (Kealey; McCann; Katz, Doucet and Stern; Lanthier and Gamelin) or industries (Burgess; Craven and Traves), while earlier studies by Gilmour and by Chambers and Bertram used the aggregate data published for census districts in broader, regional studies of the industrialization. This project will combine the regional, comparative approach of Gilmour, Chambers and Bertram with the greater specificity and flexibility of using the basic establishment data from the manuscript schedules.

11. Editor Allworth of the Brant Review, quoted in D.A. Smith, At the Forks of the Grand (Walker Press, 1956): 92-3.

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APPENDICES

BLOOMFIELD DATABANKS

Appendix A Time-Series Industrial Data ("Time-Series")

This databank comprises statistics of industrial activity in all southern Ontario urban centres with at least 1,500 population for the years 1880, 1890, 1900, 1905, 1910, 1915, 1920, 1929 (as well as for several dates until 1957). Data for 1870 will be added from that linked project (see below). For each urban centre we have details of:

- Number of establishments
- Number of employees
- Capital investment (not available for all years)
- Cost of wages and salaries
- Cost of raw materials
- Value of production.

From these data, it is possible to calculate various indices and ratios of magnitude and intensity/efficiency.

Magnitude:

(a) Value added by manufacture = Value of production - (Cost of materials + Cost of wages).
(b) Average size of establishment.
(c) Capital investment per establishment.

Intensity/Efficiency:

(a) Value added per employee.
(b) Value added per unit of capital invested.
(c) Proportion of local urban population in manufacturing employment.
(d) Average wage per industrial worker.

The time-space patterns of these indices may be derived -- variations from place to place in a particular year or rates of change in industrial magnitude and/or efficiency over short or long periods.

Such analysis may achieve typological classifications of urban centres based on their growth performance and on the significance of particular indices.

The time-series data also form a comprehensive statistical framework, to which more particular predictive or explanatory variables in the other databanks may be related.

Note: Time-series industrial data have been made machine-readable for all urban centres across Canada from 1880 to 1910 and for urban places in Quebec as well as Ontario from 1915 to 1957. Data for "central Canada," the industrial heartland of southern Ontario and southern Quebec, were analyzed as part of research for Volume III of the Historical Atlas of Canada project.

Appendix B 1870 Industrial Structure ("1870")

Details of industrial activity in 1870 for all industrial establishments in Ontario urban centres are being retrieved from the microfilmed census manuscript "schedule 6." This material is considered uniquely valuable, as equivalent data have not survived for later censuses. The project involves the reconstruction of the state of industrial activity in 150 urban or proto-urban centres for a crucial benchmark year, from which subsequent changes and growth may be measured.

The following are being coded for all industrial establishments:

- Name of proprietor,
- Designation of type of establishment/nature of business,
- Value of fixed and floating capital,
- Number of working months in the year,
- Average numbers employed, distinguished into males and females over 16 years, boys and girls under 16 years,
- Total wages paid,
- Cost of raw materials,
- Value of production,
- Moving power other than manual (water, steam, horse) with the nominal force in units of horse power,
- Codes of Canadian Standard Industrial Classification of 1970, adapted to suit the state of technology and business in 1870.

The data for types of industry in all census/electoral districts of the four provinces of Canada in 1870 have also been machine-readable, with the SIC-codes added. These data then form a framework, within which southern Ontario's emergent status as an industrial heartland may be appreciated, and within which the distinctive characteristics of industry in urban centres may be discerned in relation to industry in the rural countryside.

Data for all the industrial establishments in each urban centre are also being aggregated to provide totals for establishments, employees, capital, wages, raw materials and value of production, to be added to the time-series database, described in (1) above, which would then extend back to 1870.

The industrial structure of 1870 is being intensively analyzed, to make the most of the unique detail available for this crucial early year. In this project, 1870 is regarded as a benchmark or datum year, from which subsequent change may be measured, and in which significant variables may be found which help to explain the differential development of urban centres, and the ways in which industrial activity exerted multiplier effects in the local economies. Indices of localization would be used to determine the degree of concentration of industry generally and of

particular sectors; indices of specialization and diversification would be calculated for all urban places; the significance of such factors as capital investment, use of water power and steam power, size of establishment, productivity per worker measured for each industrial sector and size of urban place; and the potential for agglomeration economies assessed.

Further statistical analysis techniques will be used to relate the results of the analysis of the 1870 industrial structure to the comparative study of variable growth performance over the whole period 1870 - 1930. Variables to be tested for their predictive and explanatory power include structural characteristics of industrial development by 1870, such as a strong producer goods sector and a diversified range of manufacturing activity, organization in factory units rather than workshops, the use of inanimate energy, levels of capital investment, and value added by the manufacturing process. The work of Laurie and Schmitz on the industrial structure of Philadelphia has developed useful measures of the significance of the size of the work unit, the use of inanimate energy and productivity per worker, which can be applied to southern Ontario.

The full sectoral details of industrial structure in 1870, which are so regrettably not available for every census year, may still be compared with the employment and labour force data published for larger urban centres (with at least 15,000 population) at each decennial census from 1911.

NOTE: A research project based on the 1870 manuscript data for Ontario industrial establishments is currently supported by a grant from the Social Sciences and Humanities Research Council (410-85-0629)

Appendix C Municipal Milestones and Thresholds ("Municipal")

A database was created in 1982-3 describing for all (388) Ontario urban municipalities key dates relating to municipal status, innovations and improvements in urban services, especially those reflecting or facilitating urban-industrial growth.

Variables included:

Incorporated Status

- Date created a village
- Date created a town
- Date created a city
- Special change in municipal status, such as annexation or dissolution, the date of such change and the name of city/town to which annexed, if applicable
- Date created a district or county town (applicable to one urban centre in each county with these special administrative and judicial functions).

Local Newspapers

- Date of first local weekly paper
- Date of first local daily paper
- Classification of newspaper status in 1970s.

Railways

- Date and name of first railway
- Date and name of second railway
- Date and name of third railway
  (Railways also coded for major railway companies into which consolidated in late nineteenth and early twentieth centuries.)
- Classification by connectivity in 1870, 1880, 1900, 1920, whether D (Dead end), L (Line), J (Junction), T (Transfer Point)
- Competition -- whether urban centre had benefit of competitive rates between at least two railways in 1870, 1880, 1900, 1920.

Board of Trade/Chamber of Commerce

- Date of formation of first Board/Chamber, and whether chartered by Dominion Secretary of State
- Summary of development, whether continuous, defunct by 1920 and never revived, or discontinuous in operation (reviving then lapsing).

Gas and Electricity Services

- Date of first gasworks by private company
- Year of municipal takeover of gasworks
- Year of first electricity for public supply
- Summary of development of electricity service
- Year of municipal takeover of electric system (if applicable)
- Year of first connection to "Ontario Hydro" system.

Street Railways and Interurbans

- Year of first street railway; name of company
- Year of first interurban; name of company
- Year of municipal takeover of street railway system.

Waterworks and Sewerage

- Year of first waterworks service
- Summary of waterworks operation
- Year of municipal takeover of waterworks, if applicable
- Year of first sewerage system.

Library and Hospital Services

- Year of first library
- Year of Carnegie library (if applicable)
- Year of first hospital.

This material is relevant to the larger research goals in at least two ways. Innovations in urban organizations and services may be taken as evidence of local initiative; they may also help to explain the differential growth of urban places. Analysis of these data, together with the "time-series" industrial statistics, may therefore be used to test the assumption that the major centres of the mid-nineteenth century were able to secure the earliest improvements and services and thereby reinforce their initial advantages for urban-industrial growth. Similarly the significance of transportation improvements, as reflected in railway connections and competitive services by a particular date may be measured, or of an early connection to the hydro-electric power transmission system of "Ontario Hydro."

A selection of the material in this databank has been published, with short essays on each major topic, in Bloomfield, Elizabeth, Bloomfield, Gerald and McCaskell, Peter, Urban Growth and Local Services: The Development of Ontario Municipalities to 1981 (Department of Geography, University of Guelph, 1983).

Appendix D Municipal Bonuses to Manufacturers ("Bonus")

A "bonus" databank was created by assembling details of municipal inducements to manufacturers from the few comprehensive sources such as various sessional papers to 1900 and special acts of the Ontario Legislature as well as municipal financial statements for a sample of 62 municipalities throughout the period from the 1880s to 1930.

Particular data coded for this databank for each urban centre were:

1879 - 1881

- Number of cash bonuses or loans
- Value of cash bonuses or loans
- Number of tax exemptions.

1882 - 1889

- Number of bonuses and loans
- Value of bonuses and loans.

1890 - 1900

- Number of bonuses and loans
- Value of bonuses and loans.

Bonus Debt, 1894

- Declared debt by bonuses to manufacturers (return from 70 urban municipalities)
- Total property taxes collected (to calculate bonus debt as percentage of property tax revenue).

Exempt Industrial Assessment 1901

- Number of exempted enterprises declared 1900
- Total exempted value, 1901 (return from 134 municipalities)
- Total assessed value, 1901 (to calculate exempt assessment as percentage of total assessment).

Special Acts of Legislature, 1867 - 1900, relating to municipal bonuses to manufacturers.

For each:
1901 - 1910, 1911 - 1920, 1921 - 1930

- Number of cash bonuses or grants
- Number of loans

- Number of exemptions
- Other inducements (eg. free or cheap sites or services)
- Total value of inducements, if known
- Number enterprises assisted during decade.

By combining details from the various sources, relating to 178 of the 260 urban places incorporated by 1900, we have traced over 250 cash bonuses worth $2,157,215. between 1867 and 1900. In the 1890s alone there were also 556 tax exemptions, totalling nearly $10 million, but both figures are under-estimates. In a test of completeness, a comparison was made of the bonus data for the six Grand Valley urban centres of Guelph, Berlin, Waterloo, Galt, Preston and Hespeler to 1900: details from the general sources used for other Ontario urban centres constituted two-thirds of the inducements traced through the more detailed and complete municipal bylaws. For the period after 1900, a total of 250 cash bonuses worth $4,662,706. was found in a sample of 62 urban places, including all cities and towns with over 5,000 population. The bonus data have been processed to yield indices, weighted for population size, which show which urban places engaged most intensively in bonusing and in what periods. Bonus scores may also be related to the growth performance of urban centres, based on the industrial "time-series" data in (1) above, over either the short or long term.

IUS PUBLICATIONS

REPORTS

The Evolution of Urban Canada: An Analysis of Approaches and Interpretations, Report No. 4, by A.F.J. Artibise and P.-A. Linteau.
Housing Canada's Seniors, Report No. 14, by S. Goldblatt, F. Cates and J. Phillips.
Public Transit and the Public Interest: An Empirical Evaluation of Two Administrative Models, Report No. 15, by F. Frisken.
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RESEARCH AND WORKING PAPERS

Canadian Towns and Villages: An Economic Profile, 1981, Research and Working Paper No. 14, by M. Qadeer and K. Chinnery.
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